‘Ulcer’ Full thickness loss of epidermis and some dermis, which will heal with scarring
CORE TUTORIALS IN DERMATOLOGY FOR PRIMARY CARE

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PREFACE AND INTRODUCTION

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Front cover image: Meteor crater in the rolling plain of the Canyon Diablo region, 19 miles (30 km) west of Winslow, Arizona, USA. It is 4,000 feet (1,200 m) in diameter and about 690 feet (200 m) deep inside its rim, which rises nearly 200 feet (60 m) above the plain. (Source: Encyclopaedia Britannica.)
“Your mission if you choose to accept it is to enthuse GPs about leg ulcers. This tape will self destruct in five seconds. Good Luck!”

This is how I chose recently to start a teaching workshop on leg ulcer management. A cheap stunt some might say, but underlying it is my profound belief that the vast majority of doctors have abdicated their responsibility in becoming involved in leg ulcer management, and see their role as minor and advisory. The reason for the present status quo where nurses are almost wholly responsible for chronic wound management in the community are manifold; some apparent, some more obscure and lost in the mists of time. Ulcers are associated with dressings, dressings with nurses and so on. Ulcer management is regarded as unrewarding and unpleasant. Why, however, should leg ulcer management be any different say from peptic ulcer management? Both represent a medical condition where there is a discontinuity in a specialised physiological barrier which is multifactorial and requires full assessment. The model of care is very similar, yet one is traditionally a doctor’s remit and the other a nurse’s. I make no apology for including this subject as a fundamental in the Core Tutorials series; perhaps in some small way it may help redress the prevailing imbalance both in knowledge of and attitude to leg ulcer management!

Let us now look at why this area of medicine is so important, particularly to those of us involved in primary care.

- There are in excess of 100,000 active venous ulcers in the UK at any one time.
- The lifetime incidence of venous ulceration is 1%.
- The cost to the NHS is approximately £1 billion per year at present estimates.
- Leg ulcers consume 60% of district nurse time and 44% of their budget.
- The cost of “keeping an ulcer going” is estimated to be between £2,500 and £5,000 per annum. Considerable resources are wasted in maintaining rather than healing ulcers.
- 80% of leg ulcers are treated in the community.
- Wounds and dressings will perpetually appear near the top of the cost list in the regular PACT figures for virtually all GPs.
One fundamental principle has to be established before we proceed. A leg ulcer is not a diagnosis but a manifestation of the underlying disease process; this is why we doctors must continue to be involved. It is in this sphere that the skills and training to look at the greater picture through our ‘wide-angled lenses’ and not just focus on the leg ulcer, but the ‘patient with the leg ulcer’. I will develop this concept more under the section on Assessment.

It is important to define what we mean by a venous leg ulcer. It is an area of epidermal discontinuity lasting in excess of four weeks, occurring as a result of venous hypertension and calf muscle insufficiency. Such ulcers will comprise the majority estimated at between 70-80% of all leg ulcers, 10% will be of an arterial aetiology and 10-20% of a mixed aetiology.

Although many theories abound about the pathogenesis of venous ulceration at a cellular level, there is a general agreement that the fundamental problem is one of failure of the calf muscle pump due to venous incompetence, paralysis or immobility. Valve failure in either of the deep or superficial venous systems allows reflex of blood at high pressure into the vulnerable superficial veins and capillaries. This results in chronic venous hypertension which if, not corrected, leads inexorably to the process termed lipodermatosclerosis, consisting of both fibrin and haemosiderin deposition, induration, venous flare and atrophie blanche. The end result of the chronic process is the classic ‘inverted champagne bottle’ leg. Arguments about the exact nature of the microcirculatory impairment in venous disease may appear obscure and academic, but more effective treatment must surely follow once pathogenesis is more clearly defined. The need for high quality research is self evident!
A number of good comprehensive assessment tools exist; these are usually administered by nurses. Links to a doctor with a clear understanding of leg ulcer pathology are often tenuous at best. Excellent local models exist, whilst in other areas the lines of responsibility often remain fudged. This, I feel, is partially due to the fact that leg ulceration is multi-agency, involving district nurses, practice nurses, residential nursing homes, community clinics, tissue viability specialists, physicians, vascular surgeons, general surgeons, plastic surgeons, chiropodists, dermatologists, geriatricians, general practitioners, Uncle Tom Cobley and all! There are many hiding places for the unenthused!

All assessment tools should address the following:

### Relevant past and present medical history to include:
- Trauma
- Deep vein thrombosis
- Pregnancy
- Positive family history of leg ulceration
- Ischaemic heart disease
- Peripheral vascular disease
- Diabetes
- Congestive cardiac failure
- Thyroid disease
- Rheumatoid arthritis
- Autoimmune disease
- Inflammatory bowel disease
- Neoplasia
- Haemoglobinopathies
- Contact allergy
- Radiotherapy

### Social history to include:
- Smoking
- Nutritional status
- Mobility
- Foreign travel (if relevant)

### Drug history – especially:
- Non steroidal anti-inflammatories
- Cortico-steroids + other immunosuppressants
- Beta blockers
This requires very little sophisticated equipment in the community setting. Indeed, the physician or appropriately trained nurse can make a very accurate assessment of the type of ulcer on clinical grounds alone. Examination should be comprehensive to exclude previous undiagnosed underlying pathology e.g. evidence of anaemia, CCF, obesity, arthritis, diabetes, thyroid dysfunction etc. Traditionally, this is the doctor role but how many of us are involved in the assessment of leg ulcers? History and examination specific to leg ulcers includes:

1. **Site** – 88% of venous ulcers occur in the so called ‘gaiter’ area. Most commonly on the medial aspect; however, extensive venous ulcers can extend to adjacent areas of the leg. If an ulcer lies exclusively outside of the gaiter area, then you must question whether it is of venous origin. Arterial ulcers commonly occur on the dorsum or plantar aspect of the foot or on the toes.

2. **Appearance** – look for the changes of lipodermatosclerosis previously described. It would be very unusual to have a venous ulcer without background changes of venous hypertension involving the surrounding skin. Venous ulcers are normally ragged, shallow and sloping in contrast to the punched out, ‘cliff edge’ appearance of arterial or vasculitic ulcers. Is there evidence of arterial compromise – pallor, loss of hair, nail dystrophy, coldness, poor capillary return? Are the peripheral pulses palpable? NB: The dorsalis pedis pulse is congenitally absent in 10% and impalpable in a further 10% of cases.

3. **Symptoms** – is the ulcer painful? Even when extensive, venous ulcers can be relatively painless unless infected, while arterial ulcers are characteristically painful especially on elevation of the leg. An important exception is the neuropathic ulcer most commonly associated with diabetes.
Full blood count and urinalysis would suffice with other tests as indicated from the medical history and examination. There is no place for routine swabs. These should only be taken when infection is clinically indicated, either by excessive malodour, sudden deterioration or acute onset of pain or cellulitis. There must be a clear distinction between infection and contamination defined as the presence of bacteria without multiplication and colonisation defined as the presence of bacteria with multiplication, but no host reaction.

A Doppler assessment by an adequately trained professional is mandatory, preferably within six weeks of the onset of the ulcer. The equipment is inexpensive and should be readily available to every health professional dealing with ulcers. This contrasts the brachial and ankle pressures which in healthy individuals should equate. A reading of 1 or above indicates normal arterial flow; 0.8 would be the lowest level that full compression could be considered safe. Below this reading there is likely to be significant arterial disease and a vascular opinion should be considered. Modified compression can be used in experienced hands. Spuriously high and falsely reassuring Doppler indices can be obtained in poorly compressible, calcified vessels most commonly in diabetics. The paradox of leg ulcer treatment is that the best possible treatment for venous ulcers is the worst possible treatment for arterial ulcers, and the road to effective ulcer healing is littered along the way with avoidable medicolegal catastrophes!

The four cornerstones of wound management are:

1. The definition and treatment of underlying cause
2. Strict control of factors affecting healing
3. Appropriate dressings
4. Maintaining successful wound healing
Compression treatment, either in the form of bandaging systems or hosiery, is the accepted first line treatment for venous leg ulcers occurring in the absence of significant arterial pathology. No one bandaging system is clearly superior although evidence favours high compression over low compression systems. The quality of research in this important disease area remains poor and well designed randomised controlled trials incorporating economic evaluation are long overdue to arrive at optimal strategies. The dangers of inappropriate compression have already been mentioned. One study reported 147 cases of compression damage over a five year period; seven of which required arterial constructive surgery and 12 amputation. Inappropriate compression can lead to pressure necrosis even in the absence of arterial disease, especially in patients with abnormally narrow ankles or thin calves.

The gold standard was the Charing X 4 layer bandage with studies reporting 70%+ healing rates in 12 weeks. The present median duration of a venous leg ulcer in the community is nine months. Recently, a study from Cardiff using a 3 layer measured tubigrip system achieved 66% healing in the same period. Further outcome data from this study demonstrated 51% of venous ulcers were relatively easy to heal, but 33% particularly difficult to heal with responses correlating inversely to both the chronicity of the ulcer and its size at the onset of treatment. The application of multi-layer bandaging systems requires a significant degree of nursing expertise. The normal leg shape leads naturally to graduated compression by even application of compression bandaging by Laplace’s Law (Appendix 1). Ulcers do not heal well in the presence of oedema.

Of much less import to the rate of healing is the wound contact layer. **Dressings don’t heal wounds!** There are myriad regimes but very little scientific validity. This cannot be overemphasised. The frustration engendered by attempting to heal recalcitrant ulcers can be well understood but this cannot justify the constant interchanging of dressings with little regard to evidence or expense. This process is often driven by commercial pressures and unsubstantiated claims from various pharmaceutical companies. Nurses tend to be less objective and analytical of data as they have not been trained to do so, while doctors continue to remain peripheral.
Some understanding of the different broad categories of dressings and their indication is advisable for the physician; after all, it is his or her name at the bottom of the prescription! The common goal of all dressings, however, is to create an optimal environment for healing:

- moist but not macerated
- free of toxins and irritants
- optimal temperature and pH
- free of clinical infection

**EXUDATION**

![Exudation Image]

**GRANULATION**

![Granulation Image]

**SLOUGH**

![Sloough Image]

**INFECTION**

![Infection Image]
1.) Films e.g. Opsite: These are polyurethane membranes, waterproof, transparent, flexible and permeable to gas and water vapour. They are non absorptive and thus not suitable for heavily exuding wounds.

2). Foams e.g. Lyofoam: Heat treated polyurethane, very absorbent and insulating. Suitable for a wide range of granulating wounds both flat and cavity.

3). Hydrogels e.g. Intrasite: Organic polymers with an increased water content, hydrating and absorbent and capable of absorbing large amounts of exudates. These promote autolysis.

4). Alginates e.g. Kaltostat: Derived from seaweed, very absorbent, hydrating and haemostatic. These can be used in moderate or heavily exuding wounds.

5). Hydrocolloids e.g. Granuflex and Comfeel: Polymers in fine suspension, absorbent and promote autolysis. Available in pastes, granules and wafers.

6). Inert e.g. any dressings and gauze: Secondary dressings with a primarily protective role. These provide an optimal environment for moist wound healing.

7). Proteolytic e.g. Varidase: Their major indication is for use in the early healing of sloughy or infected wounds.

Where compression bandaging techniques are positively beneficial to wound healing and wound contact layer essentially neutral, cleansing and other topical agents can be positively detrimental! Antiseptics have been implicated in retarding wound healing and locally applied antibiotics are notorious skin sensitisers and should be avoided. Don’t forget that contact sensitivity is also not uncommon with steroid preparations and impregnated paste bandages. The commonest skin sensitisers in regard to leg ulceration are neomycin, lanolin, parabens and, less commonly, colophony and rubber. Many a time I have had the experience of patients having protracted treatment for ‘cellulitis’ when the real problems is one of contact sensitivity!
Adequate mechanical debridement of contaminated wounds is also important. Irrigation of ulcers with normal saline or soaking in warm water are usually adequate for cleansing. Potassium permanganate soaks, however, can be very useful particularly for extensive areas of weeping, exudative skin. Systemic antibiotics are only indicated in clinically infected ulcers and where there is evidence of cellulitis, lymphadenitis or septicaemia. Appropriate antibiotics should be used for 14 day courses to be effective. The presence of beta haemolytic *Streptococcus* always requires consideration for treatment.

Overgranulation is traditionally treated with a local application of silver nitrate. Both Flamazine (1% silver sulphadiazine) + topical metronidazole (0.8%) can be used short term in malodorous ulcers, the former when *Pseudomonas* is present and the latter in anaerobic infections.

There is some evidence of benefit both for the use of aspirin and oxpentifylline in healing chronic venous ulcers. No such benefit has been demonstrated for stanozolol. Diuretics can be useful but are not a substitute for adequate compression.

The most pessimistic data regards present recurrence rates which can be as high as 70% at one year, rising almost to 100% at five years if the deep veins are abnormal. Well fitted compression hosiery post healing and the advent of “healed ulcer” clinics will hopefully continue to impact on these depressing statistics. The application of open toe class II compression hosiery changed every three months in the recent Cardiff study reduced recurrence to 11%. A well informed patient who has been involved at all stages in their treatment is more likely to comply with post healing regimes.
Malignant changes are a recognised rare complication of chronic wounds (so called Marjolin’s ulcer). If there is clinical suspicion, a biopsy should be obtained.

**MARJOLIN’S ULCER**

![Image of a wound]

**CRITERIA FOR REFERRAL**

An appropriate referral must be considered for the following categories:

1). Venous ulcers failing to progress at three months or healed by 12 months.

2). All ulcers of an arterial or mixed aetiology for assessment for reconstructive surgical/radiological procedures.

3). Failure to adequately control underlying pathologies.

4). Suspected malignant change.

5). Selective venous ulcers post healing, especially in younger patients – 50% of patients have deep vein reflux almost invariably consequent on previous DVTs.

6). Contact sensitivity.

Rarely in medicine is there a perception that improved patient care can save money. Effective management of chronic leg ulceration is one such example!
CHAPTER 5

LEG ULCERS

TEACHING POINTS

1). A leg ulcer is not a diagnosis but a manifestation of the underlying disease process.

2). Easy access to accurate Doppler assessment should be available to all involved in leg ulcer care.

3). Dressings don’t heal wounds.

4). Leg ulcers are a high risk site for contact sensitivity reactions.

5). The healing of an ulcer is not the clinical endpoint – appropriate referral for assessment and intervention should be considered and systems for maintaining ulcer healing further developed.

REFERENCES


### LAPLACE’S LAW

**How graduated compression works**

Some of the concepts that affect the pressure exerted by bandages are explained by a Law of physics – Laplace’s Law which states

\[ P = \frac{T \times N \times \text{constant}}{C \times W} \]

- **P** = Sub bandage pressure  
  Pressure exerted by bandage.

- **T** = Tension  
  Bandage tension depends on the elasticity of the bandage i.e. how much stretch is applied on application.

- **N** = Number of layers  
  The more layers applied, the higher the sub bandage pressure, as in the multi-layer system.

- **C** = Limb circumference  
  Only variable sub bandage pressure is inversely proportional to the circumference of the leg. Therefore it is important to measure the ankle circumference – just above the malleolus (2cm). The ankle circumference will determine the regime of bandaging according to manufacturers instructions.

- **W** = Width of bandage  
  The narrower the bandage width the more compression applied. More layers are applied with narrower width. Generally a 10 cm bandage is used.